

PCT
Rec'd PCT/RO 23 AUG 2000
REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only 17753360

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference (if desired) (12 characters maximum) 50876 WO

Box No. I TITLE OF INVENTION

Method and device for adapting the configuration of an application of a mobile terminal to an accessible data connection

Box No. II APPLICANT

☐ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality:
Finland

State (that is, country) of residence:
Finland

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Joeressen, Olaf
Dechant-Faßbender-Str. 17
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This person is:

☐

applicant only

☒

applicant and inventor

☐

inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:
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State (that is, country) of residence:
Germany

This person is applicant for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☐

agent

☒

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATION OF STATES

Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (*if other kind of protection or treatment desired, specify on dotted line*)
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH & LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (*if other kind of protection or treatment desired, specify on dotted line*)

National Patent (*if other kind of protection or treatment desired, specify on dotted line*):

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> OM Oman |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> PH Philippines |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> JP Japan | |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> BZ Belize | <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> LR Liberia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> CO Colombia | <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> TN Tunisia |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> LT Lithuania | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> LU Luxembourg | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> LV Latvia | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> MA Morocco | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> MD Republic of Moldova | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> MG Madagascar | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> EC Ecuador | <input checked="" type="checkbox"/> MN Mongolia | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> MW Malawi | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> MX Mexico | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> MZ Mozambique | <input checked="" type="checkbox"/> ZM Zambia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> NO Norway | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> GD Grenada | | |
| <input checked="" type="checkbox"/> GE Georgia | | |
| <input checked="" type="checkbox"/> GH Ghana | | |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (*Confirmation (including fees) must reach the receiving Office within the 15-month time limit.*)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1)				
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office)* identified above as:

☐ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / EP

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

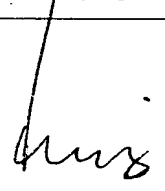
Date (day/month/year)	Number	Country (or regional Office)
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Box No. VIII DECLARATIONS

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) (*mark the applicable check-boxes below and indicate in the right column the number of each type of declaration*):

Number of
declarations

- | | | | |
|--------------------------|--------------------|--|---|
| <input type="checkbox"/> | Box No. VIII (i) | Declaration as to the identity of the inventor | : |
| <input type="checkbox"/> | Box No. VIII (ii) | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | : |
| <input type="checkbox"/> | Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> | Box No. VIII (iv) | Declaration of inventorship (only for the purposes of the designation of the United States of America) | : |
| <input type="checkbox"/> | Box No. VIII (v) | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | : |

Box No. IX CHECK LIST; LANGUAGE OF FILING		
<p>This international application contains:</p> <p>(a) the following number of sheets in paper form:</p> <p style="padding-left: 20px;">request (including declaration sheets) : 4</p> <p style="padding-left: 20px;">description (excluding sequence listing part) : 16</p> <p style="padding-left: 20px;">claims : 2</p> <p style="padding-left: 20px;">abstract : 1</p> <p style="padding-left: 20px;">drawings : 2</p> <p style="padding-left: 20px;">Sub-total number of sheets : 25</p> <p style="padding-left: 20px;">sequence listing part of description (<i>actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (b) below</i>) : _____</p> <p style="padding-left: 20px;">Total number of sheets : 25</p> <p>(b) sequence listing part of description filed in computer readable form</p> <p style="padding-left: 20px;">(i) <input type="checkbox"/> only (under Section 801(a)(i))</p> <p style="padding-left: 20px;">(ii) <input type="checkbox"/> in addition to being filed in paper form (under Section 801(a)(ii))</p> <p>Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (<i>additional copies to be indicated under item 9(ii), in right column</i>): _____</p>	<p>This international application is accompanied by the following item(s) (<i>mark the applicable check-boxes below and indicate in right column the number of each item</i>):</p> <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> fee calculation sheet : _____ 2. <input type="checkbox"/> original separate power of attorney : _____ 3. <input type="checkbox"/> original general power of attorney : _____ 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: _____ 5. <input type="checkbox"/> statement explaining lack of signature : _____ 6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): _____ 7. <input type="checkbox"/> translation of international application into (language): _____ 8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material : _____ 9. <input type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other)) <ol style="list-style-type: none"> (i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) : _____ (ii) <input type="checkbox"/> (<i>only where check-box (b)(i) or (b)(ii) is marked in left column</i>) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter : _____ (iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column : _____ 10. <input type="checkbox"/> other (<i>specify</i>): _____ 	<p>Number of items</p>
<p>Figure of the drawings which should accompany the abstract: 1</p>	<p>Language of filing of the international application: English</p>	
<p>Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE</p> <p><i>Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).</i></p> <div style="text-align: center; margin-top: 50px;">  Dr. Thomas Kurig Patent Attorney </div>		

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<p>1. Date of actual receipt of the purported international application: _____</p>	<p>2. Drawings:</p> <p><input type="checkbox"/> received:</p> <p><input type="checkbox"/> not received:</p>
<p>3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application: _____</p>	
<p>4. Date of timely receipt of the required corrections under PCT Article 11(2): _____</p>	
<p>5. International Searching Authority (if two or more are competent): ISA /</p>	<p>6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid</p>

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<p>Date of receipt of the record copy by the International Bureau: _____</p>

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International Application No.

Date stamp of the receiving Office

Applicant's or agent's
file reference

50876 WO

Applicant

Nokia Corporation et al.

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE

CHF 100,00 T

2. SEARCH FEE

CHF 1.460,00 S

International search to be carried out by

(If two or more International Searching Authorities are competent to carry out the international search, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

Where item (b) of Box No. IX applies, enter Sub-total number of sheets } 25
Where item (b) of Box No. IX does not apply, enter Total number of sheets }

b1 first 30 sheets 650,00 b1

b2 number of sheets in excess of 30 x fee per sheet = b2

b3 additional component (only if sequence listing part of description is filed in computer readable form under Section 801(a)(i), or both in that form and on paper, under Section 801(a)(ii)):

400 x fee per sheet = b3

Add amounts entered at b1, b2 and b3 and enter total at B CHF 650,00 B

Designation Fees

The international application contains 93 designations.

5 x 140,00 = CHF 700,00 D
number of designation fees payable (maximum 5) amount of designation fee

Add amounts entered at B and D and enter total at I CHF 1.350,00 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) P

5. TOTAL FEES PAYABLE

CHF 2.910,00
TOTAL

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☐ authorization to charge deposit account (see below)

☐ postal money order

☐ cash

☐ coupons

☐ cheque

☒ bank draft

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AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT

(This mode of payment may not be available at all receiving Offices)

☐ Authorization to charge the total fees indicated above.

☐ (This check-box may be marked only if the conditions for deposit accounts of the receiving Office so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.

☐ Authorization to charge the fee for priority document.

Receiving Office: RO/

Deposit Account No.:

Date:

Name:

Signature:

Assignee: Nokia Corporation
Our ref. 50876 WO WO (KG/BK)

**Method and device for adapting the configuration of an application of
a mobile terminal to an accessible data connection**

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The present invention relates to mobile terminal devices having the capability of communicating via different communication connections. The present invention relates to user devices that can access services via more than one data transfer connection, e.g. via UMTS and Bluetooth. It also relates to programs and applications executable in a mobile terminal device with a minimised requirement of user interaction. More specifically the invention relates to a simple method to adapt the settings of applications in a mobile terminal device, according to actually accessible, available or selected communication connections.

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15 Future devices will have the ability to access remote services via multiple interfaces, e.g. via UMTS (when travelling), via a short range wireless connection like a wireless LAN or Bluetooth (when not moving fast), or via a wired connection such as the Ethernet or the like (when stationary).

20 As such access technologies have significantly different characteristics, users may wish to change the configurations of applications depending on the access technology currently used. As an example, limited bandwidths of UMTS may be suitable for the use with services that require low data rates, while a Bluetooth connection would permit using the same service at much higher data rates and thereby quality. Furthermore, cost might be different depending on the access technology and users do not want to waste money by using cost-ineffective data connections.

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As an example, limited data rates of GSM (<50 kbit/s) may be suitable for the use with services that require low data rates, while a Bluetooth connection (>500 kbit/s) would permit the use of the same service at much higher data rate and thereby quality. Furthermore, the cost of accessing a network might be different depending on the access technology (Bluetooth for free, UMTS maybe costly) and it would be beneficial for the user if the device would be configurable taking

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such differences into account.

The state of the art provides, e.g. a "Method and system for increasing the quality of service at or below a threshold cost" of EP 0 848 560 A2 by Siemens Business Communication systems, which relates to the control of the selection of a data transfer connection in accordance with predetermined threshold cost. In this document the selection of the data transfer connection is executed according to predetermined optimisation algorithms, to provide the service with the best transmission quality at a given cost. The document describes an automatic data transmission connection selection, but not a simplification of the access or application parameters of a certain application.

The cited document further describes an automated data transfer channel selection, but does not adapt the configurations of applications of the mobile terminal device, because the selected channel has to provide a predefined quality of service, to be selected. If a channel does not fit the desired quality standard of the application, the channel is not selected, and therefore the characteristics of the application do not need to be adapted.

The state of the art also provides document WO 01/35689 A1 by NOKIA NETWORKS OY relating to a "Data transmission method and Network system" that is capable of selecting a data bearer according to predetermined data bearer selection parameters. This document also does not describe an easy and simple way to set the parameters of certain applications.

Both documents fail to describe the adaptation of application configurations according to the selection of a certain data transfer connection.

If the selectable data connections depend on different transfer modes, with different transfer properties, it is desirable to fit the performances of the transfer channel and an application using that channel, to optimise the overall performance.

The present invention desires to reduce the number of required user input in a mobile terminal device when selecting an appropriate data channel.

The present invention also desires to minimise the cost of a certain service for the user of the terminal device.

The present invention also desires to provide a simplified access to applications.

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According to a first aspect of the present invention, there is provided a method for adapting the configuration of an application of a mobile terminal device (MTD) to an accessible data connection. The MTD is capable of multi-mode-, multi-band or multi-interface communication, and the characteristics of a communication link used by the terminal device depend on the actually selected data transmission connection. As the transmission characteristics change, the characteristic settings of applications using the connections have to be changed accordingly, to provide an optimised service. The method is executed by the steps of: obtaining information about at least one data connection accessible, (may be after requesting said information) and setting the configurations of at least one application on said terminal device in accordance with the obtained information about said accessible data connection.

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The currently accessible data connection can be e.g. an exclusively selected data connection, if the terminal device is capable of operating only one connection at a time. Such terminal devices can e.g. comprise different transceivers for different transmission frequencies and modes, but only one base band processing means to operate the transceivers. If the terminal device is capable of operating simultaneously different transmission connections, there can be more than one currently available data connection operated simultaneously. This is especially useful for cellular phones or communicators to provide a telephone connectivity even when currently operating another data communication or connection. Such a communicator can offer e.g. a gateway option, to connect e.g. a Bluetooth-only device e.g. with the internet. The properties of the data connection can be retrieved directly from the bearer of the data connection. The properties of the data connection can be retrieved from a memory containing the properties of potentially accessible data connections within the mobile terminal device. The data connection accessible can be a data connection currently accessible, or potentially accessible.

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According to one embodiment of the invention application configurations would change seamlessly depending on the used access technology similar to the automatic activation of car

profiles when hooking up a phone to a car kit. Thus the user would automatically use services in a way that fits to the actually selected or available connection type. As an example, the resolution of video connections would be changed such that they are optimised to low cost on a costly medium while performance is optimised when the connection is cheap. Some services might even be used on selected media only. For example downloading big file attachments during email synchronisation would happen only when a fast connection is available while a confirmation would be requested on slow or costly access media. The user confirmation can e.g. be initiated by an application intending to use a data connection.

Advantageously, said obtained properties comprise an identification of said data connection. The obtained properties may contain solely an identification of the available data connection, so that the configurations for the applications can be retrieved. The only available property may be the identification (e.g. the name) of said data connection. Said information can be e.g. the name of the available data connection, so that a user can understand intuitively the principles and the operating principle of the method to simplify user interactions to customise the method. Said identification can be e.g. a proprietary code sequence enabling the adaptation of the configuration of the applications in case of a software implementation of the method. So if the device knows e.g. the maximum data transfer rates of different data transfer connections, the device can select appropriate configurations for its applications only according to the name of an available data connection.

Preferably, said information is obtained when a specific data connection is selected. Said information can be obtained by being provided simultaneously with a selection for a certain data transfer connection, or by an automatic information transfer following the selection. The data transmission connection can be selected by a user e.g. by an active selection or following a confirmation request from the terminal device. The transmission connection can be selected automatically e.g. by a selection method according to the state of the art.

Preferably, the said accessible data connection is only potentially accessible. The term potentially accessible data connection is to describe all connections the terminal device is capable to access because of its technical design, and connections the device can access or is capable to access because e.g. a data connection base station is within range. The term potentially accessible data connection can describe a data connection confirmed by a user, independently of the presence of a respective base station. The expression base station is to describe all kinds of devices the

mobile terminal device can establish a data connection with. The potential accessibility of the data connection enables a user e.g. to pre-select a data connection as accessible, even if a respective base station is out of range. So the device or an application on the device can access a selected service when a respective base station is detected by the device or the application. The properties of potentially accessible data connections can be retrieved e.g. from a memory with pre-stored properties of potentially accessible data connections.

Advantageously, said information is obtained by requesting and actively determining a currently accessible data connection. This can be carried out e.g. by an application, or a software, requesting the status of the data transmission connections. The determination can be executed periodically or can be initiated when the device or an application detects a change in an operation mode or in the data transfer connection. The determination can be executed e.g. when the terminal device scans the environment for data connection carriers within range.

Conveniently, the method further comprises a step of determining applications currently active. The determination of currently active applications enables a communication device to adapt only the settings of active applications to the currently available data connection. This reduces the amount of configurations to be adapted during operation. The advantage of the determination of active applications rises with the number of application operable with the device. For a mobile telephone with a Bluetooth and GSM connectivity for example, the number of adaptable applications is low, so the additional step of detecting currently active applications provides only a slight advantage. In the case of personal computers, communicators or communication enabled PDAs (personal digital assistants), the number of applications to be adapted is greater, so that a determination of active applications and a selective adaptation of active applications may be more advantageous.

Preferably, the method further comprises starting an application on a mobile terminal device. This additional step in connection with the other previously mentioned steps enables the device to configure an application when this application is started. With the start of an application the application requests the actually active transmission connections, and can configure itself, or be configured according to said currently active data transfer connection. The application can be configured when it is started and, if already active, a change in the data connections actually

available is detected.

Advantageously, the method further comprises a step of detecting a data transfer to be executed by an application. This reduces the number of required adaptations. With the step of detecting a data transfer to be executed, the application can request the currently available data connection only, if a transmission is to be executed. Therefore, active applications capable of transferring data are only configured, if a transmission really is to be executed. With this method, the number of required adaptations may be reduced.

- 10 Conveniently, the method further comprises the selecting of an appropriate data connection. This step can be executed e.g. by an automatic or user assisted data transfer connection detection and selection algorithm. The selection of an appropriate data transfer connection may comprise a step of requesting a user for confirming a data connection. The data connection selection can be executed by the application e.g. if the mobile terminal device detects two different available (and confirmed) data transfer connections, and the application can select one of them according to predetermined selection algorithms.

- 20 The method may even comprise two different selection steps if, e.g. a user confirms or selects two different data transfer connections and the application selects one of them according to e.g. transfer related properties.

It is to be noted that the methods to adapt the configurations of the applications of said mobile terminal device can be combined with methods to select a certain data connection automatically.

- 25 According to another aspect of the present invention, a software tool for carrying out the method adapting the configurations of an application of a mobile terminal device to an available data connection is provided. The software tool comprises program code means for performing all of the steps of the preceding description when said program is run on a mobile terminal device.

- 30 According to yet another aspect of the invention, a computer program for carrying out the method adapting the configurations of an application of a mobile terminal device to an available data connection is provided. The computer program may comprise program code means stored

on a computer readable medium for carrying out the steps of the aforementioned methods when said program product is run on a mobile terminal device.

Preferably the computer program operates in a distributed manner in different parts of the mobile terminal device. Part of the computer program can operate in connection with applications, another part of the computer program can operate, or is operated at an interface part of the mobile device. Therefore, the computer program can comprise different software elements, e.g. with different abilities.

According to another aspect of the invention, a computer program product for carrying out the method adapting the configurations of an application of a mobile terminal device to an available data connection is provided, comprising program code means stored on a computer readable medium for carrying out the methods of the preceding description when said program product is run on a mobile terminal device.

According to another aspect of the present invention a mobile terminal device is provided which is capable of adapting the configurations of applications to an available data connection. The mobile terminal device comprises data exchanging means, capable of generating or accessing a data connection, data processing means, capable of running applications, means for obtaining information about data connections currently accessible, and means for adapting the configurations of applications to available data connections. Said adapting means are preferably connected to said data processing means.

The data exchanging means of the mobile terminal device are capable of establishing at least two different data connections. These connections are exclusively or simultaneously operable.

In a preferred embodiment the mobile terminal device can be capable of operating different data connections simultaneously, wherein a running application can decide by itself which data connection it is going to use. The setting of the configurations of the applications can e.g. be selected according to the currently available connections and an e.g. application specific hierarchic algorithm.

In the simplest embodiment, the information obtaining means and a connection selection means can form a unit with the means for adapting configurations of applications and can be embodied as a single multi circuit breaker. In this simplest embodiment the multi circuit breaker switches the data transfer channel and the applications of the mobile terminal simultaneously, by switching the hardware connections between respective hardware configurations. In this embodiment the means for obtaining information about data connections currently accessible, is e.g. a mechanic connection between the switch for selecting a data transfer connection and the switches controlling the configurations of the applications. In this simplest case, even the applications can be hardware applications.

According to another embodiment of the mobile terminal device, the information obtaining means and the means for adapting configurations can be software applications running on the mobile terminal device. In this case the applications and means can be constituted by software.

Preferably, the mobile terminal device further comprises at least one means to select available data connections. This means can be used to select one of multiple data connections if e.g. the mobile terminal device is within the range of more than one base station providing different data transfer services. So e.g. the user of an automatic selection algorithm may select the best data connection available. This approach may also be used to select one of multiple data connections if e.g. the mobile terminal device is capable of multi-connection operation so that e.g. an application can select a data connection automatically. An application may even select a certain data connection automatically, when the access establishes a data connection (with or without a user confirmation) and configures the configuration server according to the selected data connection.

Advantageously, the mobile terminal device further comprises means to store the configurations of said applications for said different data connections. So the terminal device can retrieve the configurations of applications if the properties of the accessible data connection are retrieved, by retrieving them from a memory within the mobile terminal device. This memory can further include a portion to store the properties of data connections to enable the mobile terminal device to retrieve the properties of a data connection without using the data connection to request the properties from the carrier of the data connection.

In the following, the invention will be described in detail by referring to the enclosed drawings in which:

5 Figure 1 is a block diagram of a mobile terminal device, according to one embodiment of the present invention,

Figure 2 is a flowchart of a simple application adaptation method according to one embodiment of the present invention,

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Figure 3 illustrates a flowchart of an application adaptation method according to another embodiment of the present invention, and

15 Figure 4 depicts a flowchart of another method for adapting the configuration of applications according to another embodiment of the present invention.

Fig. 1 depicts a block diagram of a mobile terminal device according to an embodiment of the present invention. The picture shows an architectural view of an embodiment according to the invention. The device is depicted with four subsystems: a media selection system 2, an access
20 subsystem 4, an application system 6, and a configuration server 8. The media selection system 2 can be e.g. a user confirmed or user selected media selection system or an automatic media selection system. The media represents a communication connection or channel e.g. like Ethernet 10, GSM 12 (Global System for Mobile Communication), UMTS 14 (Universal Mobile
25 Telecommunication Service), Bluetooth 16, WLAN 18 (Wireless Local Area Network) or the like. This includes the different sub-standards and transfer protocols used for these wired or wireless communication connections like e.g. GSM/GPRS (General Packet Radio System), /CSD (Circuit Switched Data), /HCS (High-speed CSD), WAP (Wireless Application Protocol), TCP/IP (Transfer control Protocol / Internet Protocol), and the like. It is to be noted that the device may comprise additional wire or fibre optical connection features, hardware connectivity,
30 and the like. The hardware connections are not explicitly discussed, as the basic features and properties thereof, like data rates, costs, and the like are basically the same.

The access subsystem 4 can establish different data transfer connections, provided that the mobile terminal device is within the range of a respective base station (not shown). In the depicted mobile terminal device, a switch 40 controlled by the media selection system 2 via a control connection 22 selects an access system 10 – 18 of the access subsystem 4. In the depicted embodiment, the mobile terminal device is only capable of using one of the connections at the time provided by the access subsystem 4 because of the structure of the switch 40. An advanced mobile terminal device may be able to communicate via more than one data transfer channel simultaneously, and therefore may comprise an additional switch or according hard- or software elements. Such a mobile terminal device may provide a multi connectivity or even gateway functionality.

The application system 6 is provided in the mobile terminal device and is capable of operating or running the applications 50 - 56. The applications 50 - 56 can be hardware or software applications. For best performance the configuration of the application 50 - 56 should be adapted to the data connection 10 - 20 actually available, if one of the applications 50 - 56 is to transfer data. To provide a fast and simple way to adapt the configurations to the available data connection, the mobile terminal device comprises the configuration server 8. The configuration server 8 stores the application configurations 30 - 34 for the different available data connections 10 - 18. So if the device detects an available (and usable) data transfer connection, the configuration server 8 sets the configurations of the applications 50 – 56 according to the actually available, accessible or selected data transfer connection 10, e.g. Ethernet.

In the case of the application 50, e.g. an e-mail application, the application system 6 sets the switch 44 on a position to provide the configuration 10 for Ethernet to the e-mail application 50.

In case of the e-mail application, the different settings can comprise application settings of the application not directly related to an actual transmission connection. Due to lower data rate and higher cost of the connection, downloading attachments exceeding a certain size limit might be disabled when GSM 12 or UMTS 14 are the access media, while the full data rate is used in all other cases (default). The configuration server provides the information depending on the selected media to the application. The functionality could be part of the application as well.

In the case of the application 52, e.g. a video application, the application system 6 sets the switch 46 on a position to provide a default configuration 20 for Ethernet to the video application 52. The configuration provides on one hand a transmission according to the preferences of the user, and on the other hand saves the resources of the mobile terminal device.

5 In the case of than arbitrary application 56, the application system 6 sets the switch 48 on a position to provide the configuration 10 for Ethernet to the arbitrary application 56.

10 So in a restricted data transfer mode, the user can decide, e.g. if he prefers to watch a video transmission with a lowered frame frequency, or a lowered resolution or the like. For a video application, the configuration of the application can comprise e.g. the reduction of refresh cycles of a display, if a data transfer connection with a reduced frame frequency is detected. The configurations of the application can therefore comprise parameters not directly related to the data transfer process.

15 In the present embodiment, the configurations available for a single application are stored in the configuration server as application related files 32 to 34. The actual storage format is independent of the depicted file or directory structure.

20 It should be noted that the configuration can be dependent on other parameters, and can depend e.g. on the presence of e.g. an external power supply, the actual battery conditions or the like.

25 The media or data transfer connection selected by a user or an application is used as the primary access media. As WLAN/Bluetooth is supported in areas (hot spots), and because of the wireless nature of the transmission system, it is clear, that the access subsystem, the media selection subsystem, the configuration server and/or the applications may comprise the capability of an availability determination. The mobile terminal device can be capable of detecting the availability of data transmission connections, of base stations, and may be able to select the transmission connection automatically or by user confirmation. The mobile terminal device can
30 e.g. sweep the different connection to determine if a base station is within range. Preferably, the mobile terminal device may determine the availability of the transfer connection on the basis of an expected or estimated transfer variables, e.g. a minimum remaining transmission capacity e.g. on the basis of e.g. a prepaid account, a battery capacity, or the like.

It should be noted, that the configurations may be pre-configured for products to minimise user interaction. The pre-configured configuration server entries can be pre-stored on the mobile terminal device, can be varied by the user and/or can be updated by data transmission from a service provider such as the manufacturer or the provider of the data connection.

5

Figure 2 depicts a flowchart of an application adaptation method according one embodiment of the present invention. The method is to be used in a mobile terminal device to adapt the configuration of at least one applications to a data connection available. The flowchart comprises two main steps 100 and 102. In step 100 the properties of a data connection actually available on said mobile terminal device (MTD) are detected and obtained. In step 102 the configuration of said application on said terminal device is adapted in accordance with said properties obtained.

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By changing application profiles/configurations depending on the current (available or selected) access technology (or data transfer connection), users do not have to interact with the underlying technology as much as before. Therefore, the user can use different applications with different data exchange technology faster and easier. As devices that support multiple access technologies are not yet common, the problem has probably not been recognised fully yet.

15

The first step 100 presumes that a data connection is available. If it is determined that no data connection is actually available, the application configurations may be set to default values in the second step. The process of determining a data connection provider within range, or to detect e.g. a wired connection to other devices, networks, and the like, can be an arbitrary process. The base station or connection detecting algorithms can be arbitrary, and may in the simplest case be performed by user input selecting a transmission connection, and detecting if said transmission connection is actually available. In this simplest case the availability just includes the selection of one connection by a user, and may not include that this connection is actually available (e.g. because of a lack of base stations within the range of the MTD).

20

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It is to be noted, that a step of selecting a data transfer connection can be executed e.g. by an application, in case the access subsystem provides more than one available data transfer connection. In case of two confirmed data connections e.g. the application can select one of the data transfer connections according to (e.g. two) available data connections and e.g. an additional selection step.

30

In step 102 the MTD adapts the configurations of applications in the MTD, according to the obtained properties of the available data transfer connections. This may be executed by retrieving pre-stored configurations e.g. from a configuration database for each application in the MTD.

5

The invention aims to simplify the handling of configurations coming from big differences of the media (such as data rates), so it might be useful to apply the same configurations to similar media (e.g. to WLAN and Bluetooth). For example, the definition of a default configuration would be beneficial which defines the most common parameters and is applied if no individual profile exists.

10

The flowchart depicted in Figure 2 describes primarily the steps of detecting an available data transfer connection and adapting the applications accordingly. In the simplest case, the MTD is only capable of operating one data transfer connection, and all configurations of all applications are adapted to said one available data connection.

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The flowchart of figure 3 includes the steps 100 and 102 from figure 2, and extends the flowchart on one side by the steps 90 and 92, and on the other side by the step 80. Step 90 is a selecting or a determining step if a data transfer connection is available. If the data transfer connection is quoted to be available, the active applications on the MTD are detected in step 92 and the configurations of said active applications adapted to the currently available data transfer connection. In the case that e.g. no application is active, no configurations are adapted. The steps 90 and 92 reduce the number of adaptations if, e.g. only a few applications are actually active.

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When or if, as in step 80, an application is started, it can be assumed that the application has not been adapted to currently available data transfer connections. Therefore it would be desirable to adapt the applications started later, too. This may be executed by initiating e.g. a request from the started application to adapt its configuration. The method of adapting the configuration of active applications may be executed by periodically executing the method described in Fig. 2 or Fig. 3.

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The implementation can be done in SW (software) by providing access technology characteristics and associated user preferences via an access technology configuration server (a piece of SW).

Applications would retrieve the configuration information from such a server when they are started or when they perform certain actions (e.g. synchronise email). Additionally, the server could send messages to applications as well as informing them about changing configurations due to changes of the media. The server would provide data on request but could as well issue a change event to running applications in case a profile change happens.

The flowchart depicted in figure 3 illustrates basically the same method depicted in figure 2 with the difference, that only the configurations of active or operating applications are adapted to the characteristics of currently available data connections. Applications started after the selection or the detection of available data transfer connections may not be adapted to the currently available data transfer connection and have to be adapted following their activation. While in figure 2 all applications are adapted, in figure 3 the adaptation is only executed if an application is active.

Figure 4 depicts a flowchart with a minimised number of adaptations. The adaptation may be only executed if a data transfer to be executed is detected, as in step 90. This may further reduce the number of adaptations to be performed. An application is started in step 80, it keeps running on the MTD until the MTD or the application detects a data transfer to be executed in step 90. This transfer can be an incoming or an outgoing data transfer. Following the detection, the properties of available data transfer connection is obtained in step 100 and the configuration of the application is adapted accordingly in step 102. Followed by the data transfer in step 104. This is the method with the lowest number of adaptations of configurations.

If the obtained properties of the available data connections provide more than one available data connection, the MTD or the application can select one of the available connections e.g. according to a pre-stored algorithm, a pre-stored table or an additional user confirmation.

The flowchart depicted in figure 4 illustrates basically the same method as depicted in figure 3 with the difference, that the configurations of applications are adapted in dependence of actually required data transfers, and not of actually active applications. While in figure 3 all active applications are adapted, in figure 4 the adaptation is only executed if a data transfer is actually required.

It should be noted that the MTD may be provided with pre-set numbers of configurations, so that the MTD can provide the features of the invention directly after being sold without the need of further user interaction. The configurations to be retrieved may be updated by using one of the data connection provided by the MTD. The configuration may be provided from a manufacturer or from a data transfer connection provider, such as a internet provider, a mobile communication net provider or the like. The configurations may be downloaded from internet, WAP, I-Mode Internet or the like, respectively . It is to be noted that the user may customise the configurations, by input.

It should be noted that the expression data transfer channel and data channel is used to describe the different data transfer media such as wired and wireless transfer media such as Ethernet, Twisted Pair, fibre optical, infrared, radio and the like, different data transfer standards as GSM, UMTS, Bluetooth, WLAN and the like, but also the different data transfer modes within said standards as e.g. GPRS, CSD or HCSN for the GSM Network.

It should further be noted that the MTD can be a mobile telephone, a communicator, a portable computer such as e.g. a laptop, palmtop or tabloid computer a PDA (Personal Digital Assistant) or the like with multi-connectivity. The term "multi connectivity" is used to describe devices capable of communicating via different communication media.

Lastly, it should be noted that the three methods may be combined, so that e.g. the mobile terminal device can automatically decide which of the three depicted methods is the best to be applied according to parameters like total number of active applications, number of available applications, number of technically or actually available data transfer connections, or the ratios of said numbers.

This application contains the description of implementations and embodiments of the present invention with the help of examples. It will be appreciated by a person skilled in the art that the present invention is not restricted to details of the embodiments presented above, and that the invention can also be implemented in another form without deviating from the characteristics of the invention. The embodiments presented above should be considered illustrative, but not restricting. Thus the possibilities of implementing and using the invention are only restricted by

the enclosed claims. Consequently, various options of implementing the invention as determined by the claims, including equivalent implementations, also belong to the scope of the invention.

Claims

1. Method for adapting the configuration of at least one application of a mobile terminal device to an accessible data connection, by the steps of:
 - 5 - obtaining properties of at least one data connection accessible from said mobile terminal device; and
 - adapting the configuration of said application on said terminal device in accordance with said properties.
- 10 2. Method according to claim 1, wherein the only available property comprises the identification of said data connection.
3. Method according to claim 1 or 2, wherein said properties are obtained when a specific data connection is selected.
- 15 4. Method according to anyone of the claims 1 to 3, wherein said at least one accessible data connection is a potentially accessible data connection.
5. Method according to anyone of the claims 1 to 4, further comprising the step of determining actually accessible data connections, and wherein said properties are obtained during said determination.
- 20 6. Method according to anyone of the preceding claims, further comprising the step of determining active applications, and adapting the configurations of said determined active applications.
- 25 7. Method according to anyone of the preceding claims, further comprising the step of starting an application on a mobile terminal device prior to obtaining said properties.
- 30 8. Method according to anyone of the preceding claims, further comprising the step of detecting a data transfer to be performed by an application, prior to obtaining said properties.
9. Method according to anyone of the preceding claims, further comprising the step of selecting an appropriate data connection.
- 35 10. Software tool for adapting the configuration of an application of a mobile terminal to an accessible data connection, comprising program code means for carrying out the steps of

anyone of claims 1 to 9 when said program is run on a mobile terminal device.

5 11. Computer program for adapting the configuration of an application of a mobile terminal to an accessible data connection, comprising program code means for carrying out the steps of anyone of claims 1 to 9 when said program is run on a mobile terminal device.

10 12. Computer program product comprising program code means stored on a computer readable medium for carrying out the method of anyone of claims 1 to 9 when said program product is run on a mobile terminal device.

13. Mobile terminal device capable of adapting the configuration of applications to an accessible data connection, comprising:

- 15
- data exchanging means, capable of accessing at least one data connection;
 - data processing means, capable of running applications;
 - means for obtaining properties of at least one data connection accessible by said data exchanging means; and
 - means for adapting the configurations of at least one application according to said obtained properties.

20 14. Mobile terminal device according to claim 13, further comprising means for selecting one of said at least one accessible data connections.

25 15. Mobile terminal device according to claim 13 or 14, further comprising means for storing said configurations of said applications for said at least one accessible data connection.

Abstract

There is provided a method for adapting the configuration of at least one application of a mobile terminal device to an accessible data connection, by the steps of:

- 5 - obtaining properties of at least one data connection accessible from said mobile terminal device; and
- adapting the configuration of said application on said terminal device in accordance with said properties.

10 Further, there is provided a mobile terminal device capable of adapting the configuration of applications to an accessible data connection, comprising:

- data exchanging means, capable of accessing at least one data connection;
- data processing means, capable of running applications;
- means for obtaining properties of at least one data connection accessible by said data exchanging means; and
- 15 - means for adapting the configurations of at least one application according to said obtained properties.

(Fig. 1)

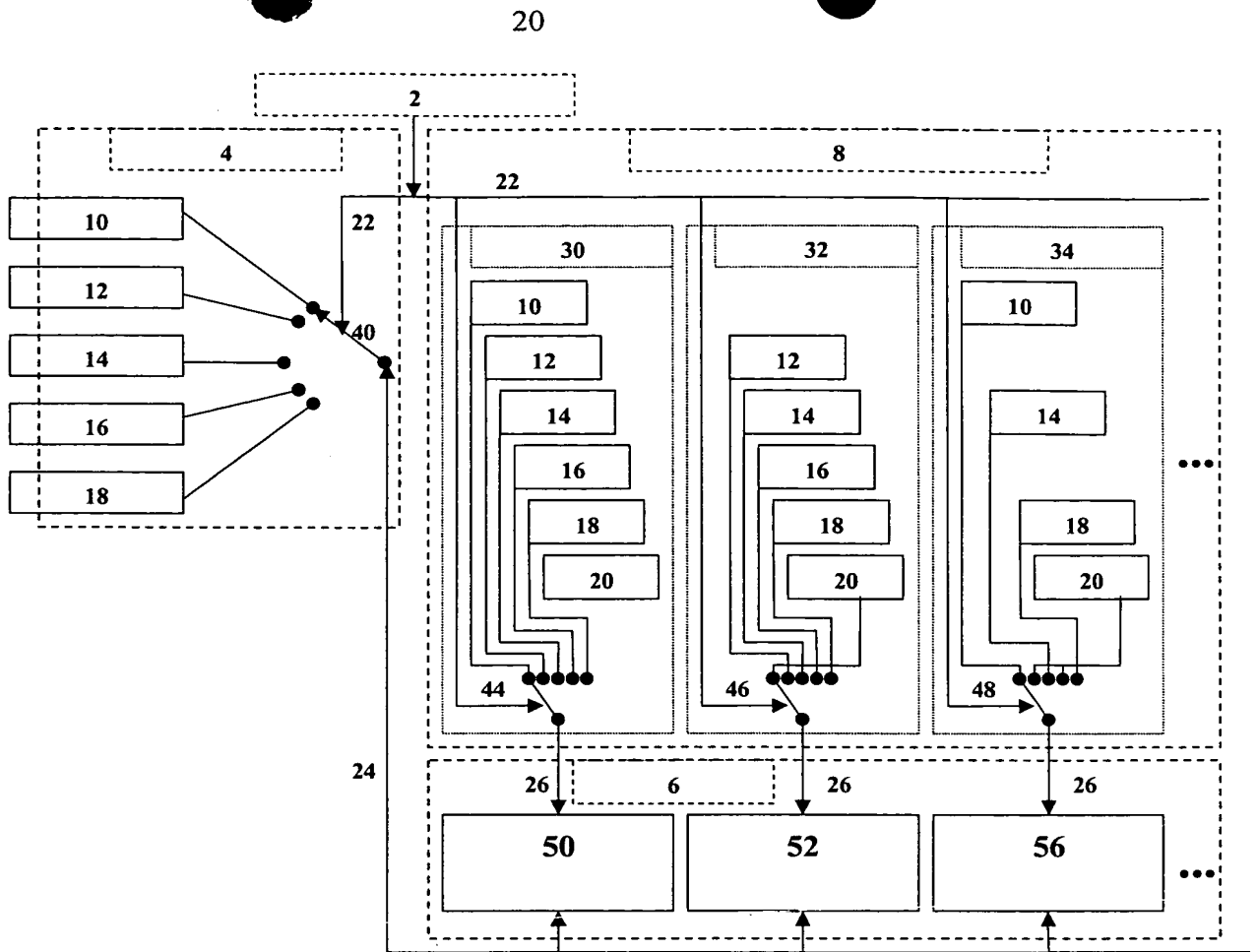


Fig. 1

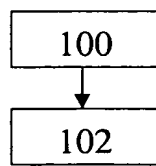


Fig. 2

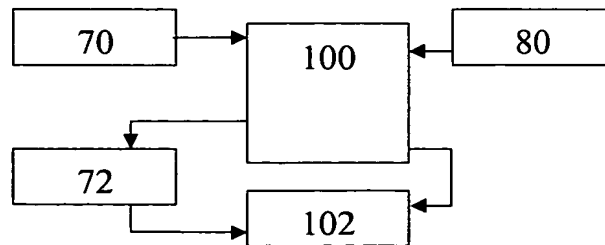


Fig. 3

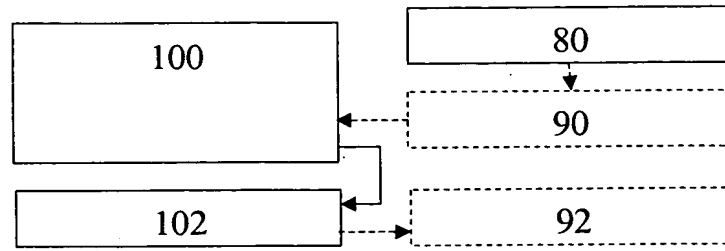


Fig. 4